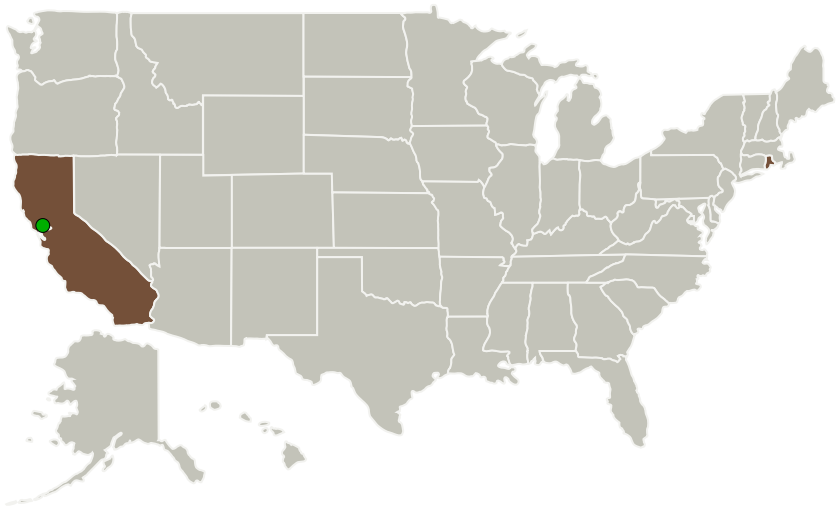
3D Polar Woven Deployable Skirt with Integrally Woven Attachment Features, Phase I

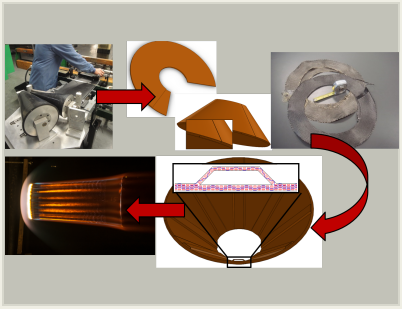
Completed Technology Project (2017 - 2017)

Project Introduction

T.E.A.M., Inc. proposes to develop and demonstrate a manufacturing method for a 3D woven deployable skirt structure with polar fiber orientation and integrally woven rib attachment features and trailing edge radii. The novelty of our approach comes from the combination of several unique textile manufacturing technologies that to our knowledge have never been successfully combined into a single process. This includes application of traditional "2D" polar weaving techniques to a variable thickness 3D weave architecture and conical geometry, respectively. 3D woven acreage material will leverage 3D-TPS weave architectures previously developed and arc-jet tested by T.E.A.M., Inc. Likewise the single radial joint resulting from the polar woven approach will be reinforced using TEAM's previously arc jet tested 3D-TPS stitching technology. Multiple iterations of the acreage 3D polar weave, radial joint configuration, trailing edge radii and seamless trailing edge close-outs will be demonstrated and quantitatively compared in both flat and formed states. The developed process will be scalable to >3m base diameter on existing T.E.A.M., Inc. 3D weaving equipment. The overall goal of the Phase I effort will be to optimize the manufacturing process parameters for scale-up to 1-3m scale in Phase 2. Heat flux exposure and post heat flux mechanical testing of the developed solution are also planned in Phase 2.

Primary U.S. Work Locations and Key Partners





3D Polar Woven Deployable Skirt with Integrally Woven Attachment Features, Phase I Briefing Chart Image

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
T.E.A.M., Inc.	Lead Organization	Industry	Woonsocket, Rhode Island
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Rhode Island

Project Transitions

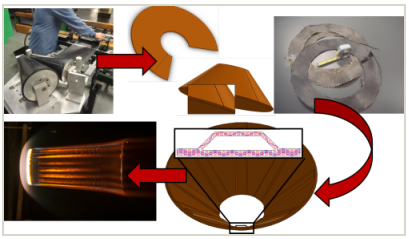
June 2017: Project Start

December 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140821)*

Images



Briefing Chart Image
3D Polar Woven Deployable Skirt with Integrally Woven Attachment Features, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/134844)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
T.E.A.M., Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

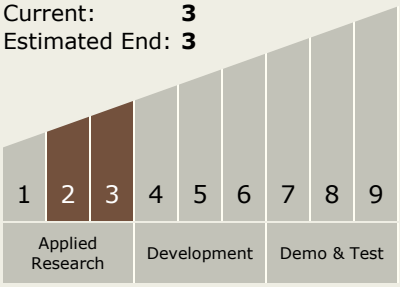
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Aaron Tomich

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.1 Aeroassist and Atmospheric Entry
    - TX09.1.2 Hypersonic Decelerators

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System